McNeil Group Mentoring Handbook

This handbook was inspired by & based on HHMI's "Entering Mentoring" training sessions/workshops that the McNeil Group did (using the online handbook) in Fall 2021.

Last Updated: Oct 7, 2022

http://mcneilgroup.chem.lsa.umich.edu/

Getting started with mentoring

Congratulations – you are going to be a mentor!

Mentoring can be a rewarding experience for both the mentee and mentor, and if successful, it will build a personal and professional relationship that will evolve over time. An effective mentoring relationship is built on mutual trust, respect, understanding, and empathy. Mentors are good listeners, good observers, and good problem-solvers. The amount of help, information, and encouragement you provide will vary over time.

This handbook is meant to provide you with practical advice by walking you through the mentoring process and it is also meant to help you be a more reflective and effective mentor. You will learn how to design and implement a good research project. You will reflect on your experience as a mentee and what you feel makes a good mentor. You will also learn how to effectively communicate with your mentee.

But first…think about your answers to these questions:

- What do you hope to get out of this mentoring experience?
- What are some features of previous mentors that you want to emulate?
- What are some features of previous mentors that you want to avoid?
- What will your approach to mentoring be?

It may be useful to share your answers to these questions with an older student/postdoc or with Anne prior to starting your mentoring experience.

Elements of good project

Your first step in mentoring is to design an appropriate and interesting research project for your mentee. Below are some guidelines to help get you started. Consult with Anne and others in the group as you brainstorm ideas.

Reasonable scope: When crafting a project for your mentee, first consider the timeframe available for reaching the goals. Will they be working full-time over the summer or part-time during the semester? The mentee should be able to meet the project goals within this timeframe.

Feasible: We should have some reason to believe that the project will work as planned or at least yield some interesting data that the student can present. It is helpful if the project builds off your initial results and you have some preliminary data that can be followed up and then extended.

Avoid cookbooks: At the same time, the project should have unknowns and not just involve repeating something you (or someone else in the lab) have already done.

Built-in challenges: The project should involve some built-in challenges for the student to face once they have some experience and confidence.

Multifaceted: The student should learn more than one technique or skill and constantly be learning.

Background: Consider the background, skills, and training the mentee has already acquired. Consider also how you will build the background knowledge of your mentee. It is unlikely that they will come in with knowledge specific to the project.

Defined goals: Be clear about the goals of the project and define three or four "milestones" that can be reached along the way.

Interesting: Both you and your mentee should be interested in the end-result.

Once you have put some thought into the project, start by writing a 6-sentence abstract (see guidelines in the group manual) for your student to understand the bigger picture goals and motivation behind the project. Then draft a series of goals/milestones for the student to reach (including chemdraw structures as needed). The entire document should be about 1 page. Share this document with Anne (for feedback and approval) prior to your first meeting with your mentee.

Ask yourself the following questions:

- What excites you about this project?
- What do you think the biggest challenges will be?

Establishing a good relationship

Get to know your mentee by asking them to meet for coffee/tea or lunch prior to their first day in the lab. Here are a few conversation starters:

- Where do you consider home?
- What do you do for fun? What hobbies do you enjoy?
- How/when did you become interested in a career in science?
- What is your (intended) major and what are your career plans?
- Do you have any previous research experience? If so, what did you like/dislike about it?
- How do you learn best (e.g., verbal versus written explanations)?
- How do you prefer to receive feedback (e.g., verbal versus written)?
- Do you have any questions about the background of the project?
- What science lab courses have you taken? What science courses have you taken?
- Do you have any concerns or special needs that I should be aware of?

When talking to your mentee, try to make direct eye contact and be enthusiastic. As much as possible, try to establish a knowledge/skills baseline so you know what level of detail your explanations need to be at.

In addition to these "getting to know you" questions, spend some time discussing the research project (share the 6-sentence abstract & project outline) and talk about the big picture. Clearly express your expectations (e.g., hours and commitment) and ask the mentee to share theirs as well.

Discuss briefly your background and experiences in science as well as in mentoring.

Go over lab policies (see next section) and remind them that it is better to ask questions than to make a mistake that could have been easily avoided.

At the end, give them a tour of the lab and introduce them to the other lab members. A brief tour of the 2nd floor is also useful, including nearest bathrooms and how to exit the building (e.g., nearest staircase). Be sure to establish a regular time for communication, e.g., once a week where you sit down and reflect on the week's progress and assess whether there needs to be any changes, and where you give the mentee direct feedback.

One useful activity you can do the next time you meet with the mentee is have them explain their project back to you. You could also have them draw a flowchart of the project with the specific goals and timelines and share it with you.

Setting Expectations

What mentors expect

Each mentor will have expectations for their mentee, and you should share these with your mentee, and ideally put them in writing after the conversation. Below are some guidelines for setting up these expectations.

- What specific working hours and days will your mentee be working?
- How should they communicate with you if they will be late or need to cancel?
- What should they do to prepare for their work each time they come in?
- When should they expect some level of independence and how should they let you know?
- How can they demonstrate their interest in the project?
- How often should they check-in with you?

What mentees expect

Each mentee will have expectations for their mentor, and they should share these with you, and ideally put them in writing after the conversation. Below are some examples of mentee expectations.

- That their mentor will frequently check-in with them.
- That their mentor's expectations are clear and reasonable.
- That they will be treated with respect and dignity.
- That their mentor will be patient and kind.
- That they will be welcomed into the group as a full member.
- That they can trust their mentor.
- That they will learn new skills and new knowledge.
- That their work will contribute to the overall mission of the lab.

Setting Research Goals

You and your mentee should together set weekly and monthly research goals that are reasonable in scope. Using these goals, the mentee should practice setting daily research goals for themselves. At your weekly or every-other-week check-in, you should discuss and revise these goals as needed. (Examples of goals for graduate students and postdocs can be found in the "General Goals for Graduates and Post-Docs" document on Drive.)

Giving and Getting Feedback

Giving Feedback

It is important to give frequent (weekly for full-time students; every other week for part-time students) feedback to your mentee, especially in the beginning of their time in the lab. Here are some suggestions for how to make this process a positive experience for both you and your mentee.

- *Focus on a specific behavior or issue.* Avoid vague generalizations which are unhelpful.
  - "You are too messy in the lab." versus "You should clean your glassware before the end of each day."
- *Suggest a different way of doing it and emphasize that they are capable of it.* Explain how it will benefit them.
  - "If you work up your spectra in Illustrator, then you can re-format the text to make it readable, highlight specific peaks in the spectra in different colors, and have a clearer presentation of your data."
- *Remember to give feedback the way your mentee prefers (written versus verbal).*

Consider using the "sandwich" strategy:
- Embed the critique between two things they are already doing well.
  - "You have been doing such a great job with picking appropriate solvent combinations for your column chromatography, but I think the whole process will go a bit faster if you collect larger fractions next time for this size column. Then you will have less glassware to clean up too. I have been impressed with how quickly you've picked up this lab skill."

Getting Feedback

Mentoring is a two-way street, you are both learning from each other and the experience. Your mentee might feel intimidated to give you feedback, but try to encourage an environment and relationship where they can provide this feedback.

- *Remind yourself and them that this feedback will help you improve your mentoring and communication skills.*
- *Be specific in your ask using "what".*
  - "What can I do to improve my explanations of lab techniques?"
- *Ask what is working well and what is not working.*
  - I usually ask for three things that I should "keep the same" and three things that I should "improve or fix."

I have been a Professor for 15 years, and I still ask my group each year to do an annual (anonymous) evaluation to get feedback, and as students graduate and move-on, I ask for their feedback in an exit meeting as well.

Resolving conflicts

Conflicts are bound to happen, but keeping a mutually respectful communication channel between the mentor and mentee can help you through them.

Some examples might include:

- *The mentee isn't engaged or motivated by the project*: See if there are ways to modify or switch the project. Remind them that all projects go through ups and downs and sometimes we can simply change the approach and sometimes bigger changes are needed. Consult with Anne before agreeing to any significant changes to the project directions.

- *The mentee isn't getting along with the mentor*: They should try to identify the specific problems and work first with the mentor to see if the situation improves with this feedback. If that doesn't work, they should consult with Anne on how to proceed.

- *The mentor isn't getting along with the mentee*: They should try to identify the specific problems and work first with the mentee to see if the situation improves with this feedback. If that doesn't work, they should consult with Anne on how to proceed.

Choose a safe space (e.g., coffee shop or bench in the diag) and a good time to have these conversations. Be clear with your intentions and goals for the upcoming conversation, and ask them when a good time would be to meet to discuss them. You want them to come to the meeting prepared to discuss the topic(s). Be collaborative in your approach, most likely there are issues on both sides that need to be discussed and resolved.

Getting started in the lab

There is a lot to learn when a new student first joins the lab! It can be overwhelming for both you and the mentee. Below we have created a checklist to make sure all the important points are covered. You do not need to introduce all of these skills in the first week. Instead, introduce them when it's most appropriate.

Keep in mind that when teaching someone a new skill, it is useful to first show them how it is done by doing it yourself and narrating the process to them. Then, let them do it with you watching, so that you can correct any mistakes. Once they have demonstrated the skill without any verbal guidance and with no mistakes, you can let them do it independently. Some mentees may feel comfortable with more guidance (e.g., you doing it more than once or you watching them do it more than once). Be patient and make sure they are comfortable before letting them do it alone.

Safety
- Make sure they have completed the online safety training and have uploaded their certificate on Drive.
- Make sure they have read & signed the blue binders in the kitchen.
- Make sure they have completed the lab safety agreement and uploaded the signed version to Drive.
- Make sure they have done the lab safety walk-through with a safety officer.
- Make sure they have read the entire group manual.
- Go over some key points including proper clothing & PPE, waste disposal, labeling waste, spill cleanup, handling chemicals, etc.
- Go over rules about food & drink in the lab and lab kitchen.
- Go over good chemical hygiene like cleaning up after yourself in shared spaces, not returning excess chemicals to the original bottle, cleaning spatulas, etc.

Navigating the lab

- Go over subgroup meeting expectations (see group manual).
- Go over expectations for laboratory notebooks, including adding both processed and original data files, and backing up your data in your lab notebook (see group manual).
- Go over proper labeling of samples (see group manual).
- Where shared/common supplies are stored.
- Point out online references & resources (e.g., group website training manuals and shared Google Drive) and within lab resources (e.g., purification of laboratory compounds).
- Show them how to search the chemical inventory.
- Show them how to order supplies & reagents.
- Go over the basic group guidelines for generating graphs/tables/slides/chemdraw (see group manual).
- Go over how to download and use ChemDraw and Illustrator.

Introducing basic lab techniques

- Schlenk line & vacuum pumps
- Syringing and pipetting correctly
- How to dispose of solid, liquid, sharps waste (and labeling waste bottles)
- TLC
- Running a column by hand before using the Biotage
- Rotovaps
- Cleaning glassware

Searching the literature

- Reaxys, SciFinder, Web of Science - when to use which one and examples of the workflow within each system (e.g., how to search for a synthesis of a compound)
- How to set up literature alerts for specific topics (e.g., from journals, google, etc.)
- Chemistry reference resolver
- Reference managers and ASAP managers
- Library resources, including iliad and e-EROS
- Where to find safety information about reagents/techniques online (Not voodoo, MSDS, SafetyNet)

Reading a paper effectively

- Encourage frequent reading of latest literature & write quick summaries
- Reading for specific information versus reading for general background information
- Encourage active participation in literature meetings (reading the paper ahead of time)
- Discuss authorship criteria and roles
- Reading papers before a seminar presentation

Where to get help

If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. If it is an emergency, please call 911 or (734)996-4747 for U-M Psychiatric Emergency Services. If it is not an emergency, call (734)764-8312, and press 0 for CAPS Crisis Counselor on Duty. For UM graduate students, there is an embedded counselor in the Chemistry Department (Ashley Jacob, (734)764-8312 or

ashjacob@umich.edu. Some national resources include the LGBT Suicide Hotline: 1-866-4-U-TREVOR and 1-800-273-TALK (1-800-273-8255).

If you or someone you know is dealing with sexual misconduct (which includes harassment, domestic and dating violence, sexual assault, and stalking) to talk to someone about their experience, so they can get the support they need. Confidential support and academic advocacy can be found with the Sexual Assault Prevention and Awareness Center (SAPAC) on their 24-hour crisis line, (734)936-3333. Alleged violations can be non-confidentially reported to the Office for Institutional Equity (OIE).

Final thoughts

Perhaps the most useful piece of advice that I've received is to remember that your mentee is not the same as you and you shouldn't expect them to be. Take the time to learn about what motivates them, what works best for communicating with them, and what their goals for this research experience might be.

One of the biggest joys that comes from mentoring is seeing your mentee achieve their goals – both in the lab and in their careers/life. Remember that you are a small (but important) part of their journey and you should do your best to make it a positive learning experience for both of you.